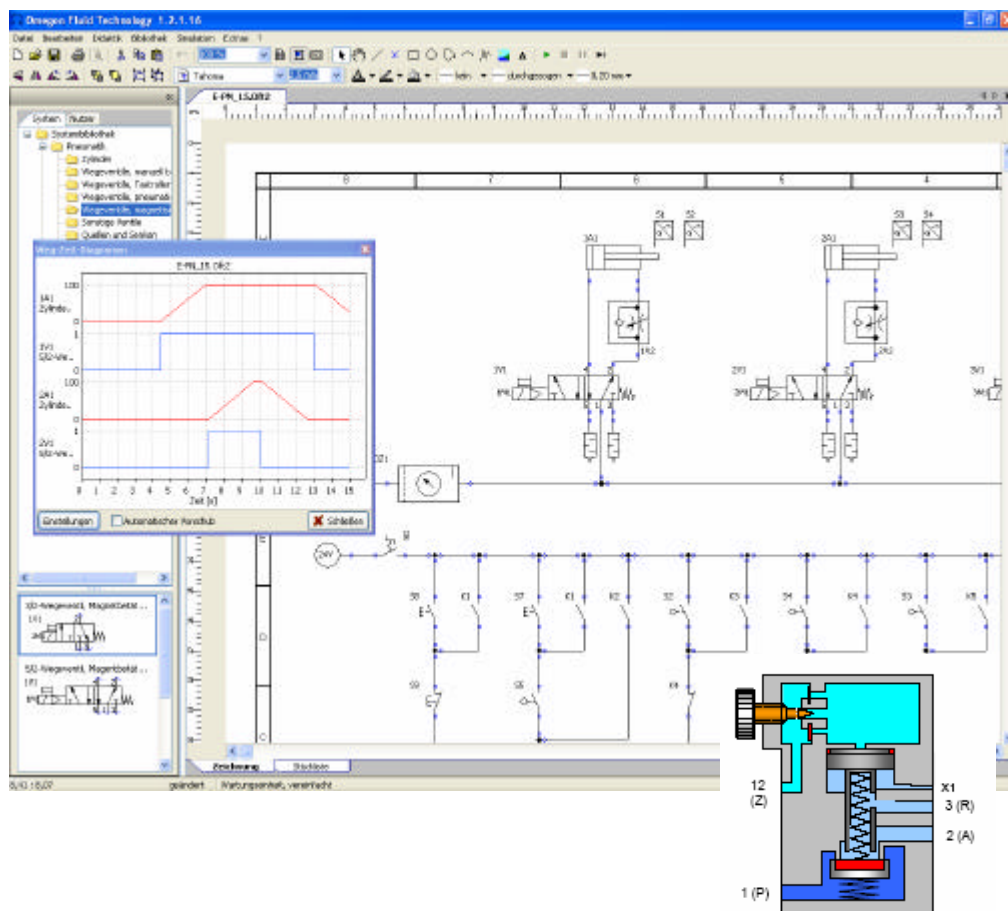




Manual



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Basics

Introduction

The OFT-software provides the user with a programme that can be used to draw circuit diagrammes which can then also be simulated or animated.

This documentation has been compiled in order to give the user all the basic information that is needed for using this programme. Various exercises will help you to get an overview of the single libraries using pneumatic, hydraulic and electric symbols for creating circuit diagrammes.

We would appreciate any suggestions for improvement to this documentation.

For working with our OFT-programme, you should have a fundamental knowledge of the Windows operating system.

Both Windows XP and Windows Vista are supported. The computer should be equipped with the RAM and hard drive capacity as required by these operating systems.

For viewing the animations, we suggest that you adjust the screen resolution to a colour depth of 16 bits. However, as with any CAD programme, it is an advantage to use a larger monitor.

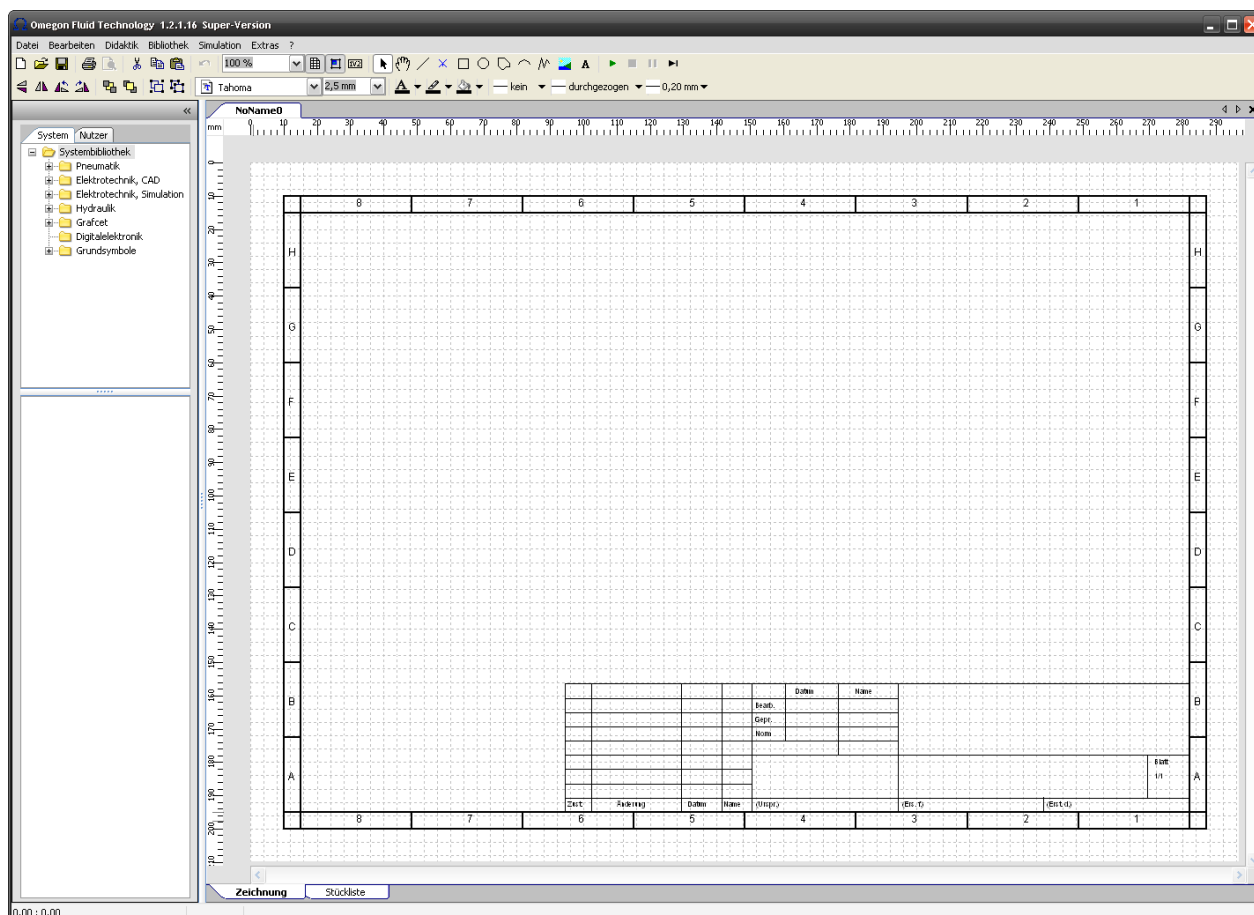
If the OFT-programme has not yet been installed on your computer, we suggest that you insert the CD-ROM in the appropriate disk drive and follow the instructions. Please note that some networks file designations do not allow the usage of blanks and points. We suggest that you consider this restriction when assigning a file designation.

If an older software version has been installed on your computer, it should be removed, before installing a newer version. Save your old projects before the new installation to ensure that they do not get lost by accident! Also secure the licence file 'oft20.lic'! You will find this file under 'Documents and Settings /All users / Common Documents / Omegon / Oft2 / Licence '.

Please note!

Before drawing a circuit diagramme landscape format should be chosen. It is also recommended to select the size DIN A3. This enables larger circuit diagrammes to be generated. The printout can be adjusted to size DIN A4.

In order to be able to use the complete working space for creating the diagramme, the title block can be deactivated.



Closing a project

Click on the close button in order to close the blank work sheet.

A project can also be closed by clicking on menu option 'File' 'Close'. If changes have been made, you will be asked if you want to save the project.

Opening a project

An existing circuit diagramme can be opened by clicking on menu option 'File' 'Open project' or clicking on the symbol 'Open project'. Examples are offered under the menu option 'File' 'Open samples'. The following window – see below – listing the sample files, is opened. These sample projects are very well suited for showing the functionality of the programme.

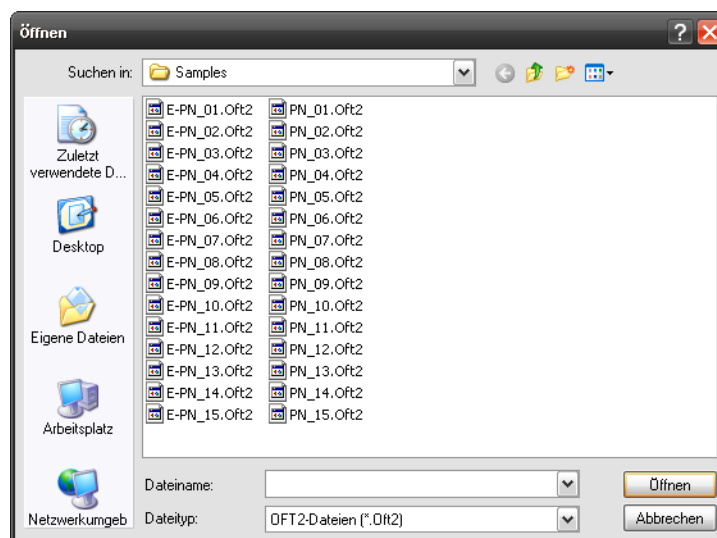
Projects are marked with the file appendix 'oft2'. Only these files will be indicated.

The samples files can be found on the hard drive under 'Common documents / Omegon / Oft2 / Samples'. Newly created projects are filed under 'Own files / Omegon / Oft2 / Files'.

A sample project - see list below - should be started. We suggest that you select the sample project „PN_10.oft2“

Double click on the project or click 'Open' to call up the selected circuit diagramme.

Figure 2



Zoom

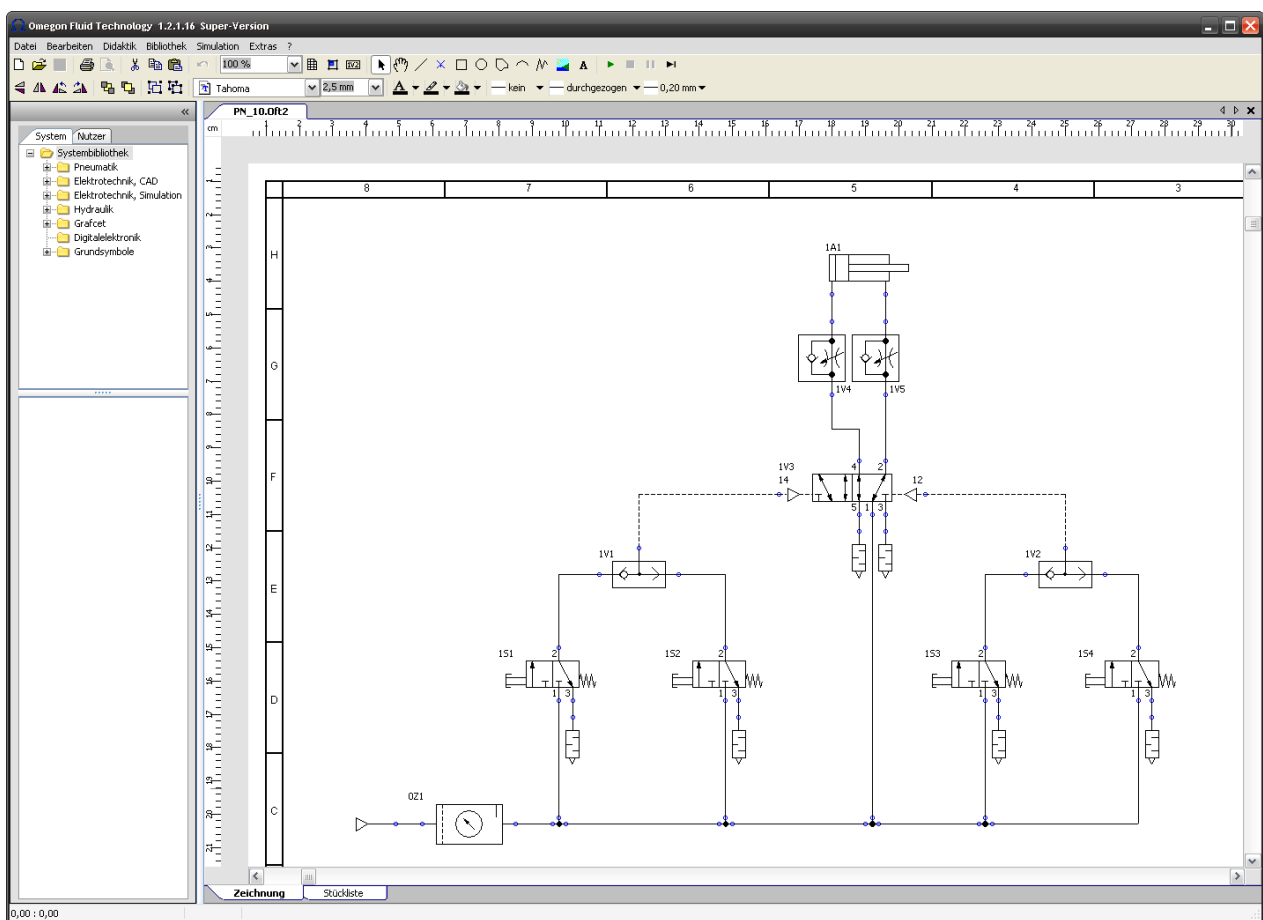
The circuit diagramme can be adapted to the size of the window by activating the zoom-button in the icon bar. In this way the size of a circuit diagramme can be increased or decreased.

It is also possible to switch the grid on or off, by activating the button next to the zoom button in the icon bar. With a click on the next button to the right the symbol will be locked on the grid. The legends of the symbols will be framed with a click on the next button on the right.

At the bottom of the drawing are two tabs which enable the user to switch between the left drawing and the parts list.

If several projects are opened at the same time, you can switch between projects by clicking on the index tab above the window of the project.

Figure 3



Simulation mode

The simulation can be started by clicking on the menu option 'Simulation'. However, it can also be started by clicking on the green triangle in the icon bar.

During the simulation mode the colour of the lines/pipes can change. This shows which line/pipe is under pressure or under tension and shows changes which occur during the simulation.

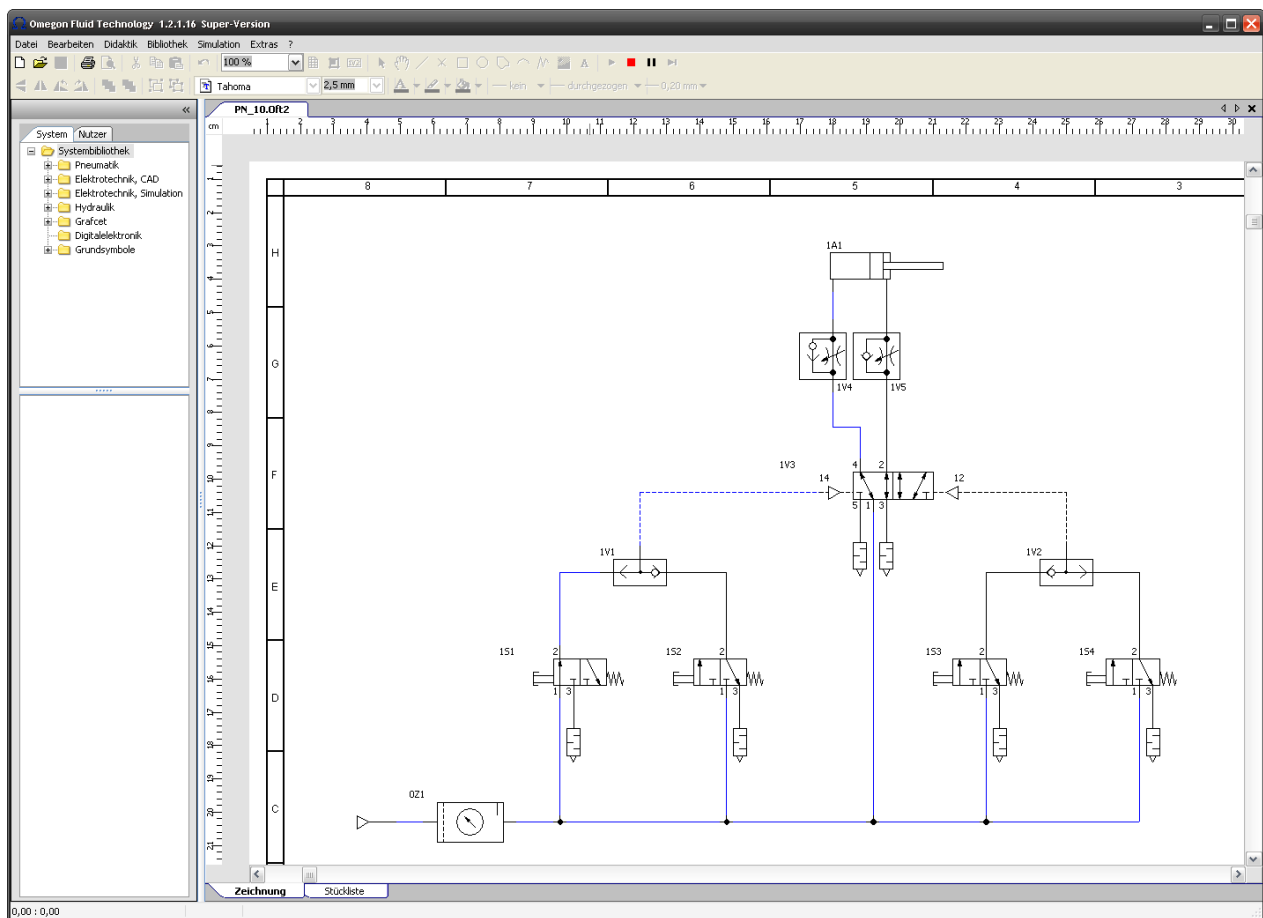
By clicking, for example the button „1S1“ the simulation can be started and the cylinder moves. If the shift

key is held down when the button is pressed, this will keep the simulation activated until it is stopped by a new click of the button.

Clicking the pause icon will stop the simulation and another click will start it again. It is also possible to start a single step simulation by clicking on the single step icon. The operating sequence of more complex circuit diagrams can thereby be better observed.

Please also try out other examples of the circuit diagrammes!

Figure 4



Configuration of the programme

Various initial settings for a new project can be determined or changes for a current project can be carried out in menu option 'File' 'Programme settings'.

The size of the work sheet can be stipulated under the tab 'New drawing'. Alignment in either portrait- or landscape format is possible.

The units can be selected, mm, cm and inch are available.

It can be stipulated whether the grid should be shown and whether the symbol should be locked in to the grid by inserting a check mark. The values for the grid and symbol locking can be adjusted independently.

There is also an option of showing the title block. The company data can be initialized so it is always

available automatically. In menu option 'Extras' 'Title block' various relevant data can be entered.

Another small box stipulates whether the legend of the symbols should be framed or not.

The x-axis of the path-time diagramme can be also adjusted.

The tab index 'Generally' stipulates the function of the scroll wheel of the mouse. A drawing can be moved or zoomed by the use of the scroll wheel. It is also possible to deactivate the scroll wheel.

The tab index 'User data' offers the addition of various information related to the parts list. Data fields regarding the parts list can be added or deleted. A check mark in the respective line stipulates whether the appropriate fields should be summarized into the sum list in a line.

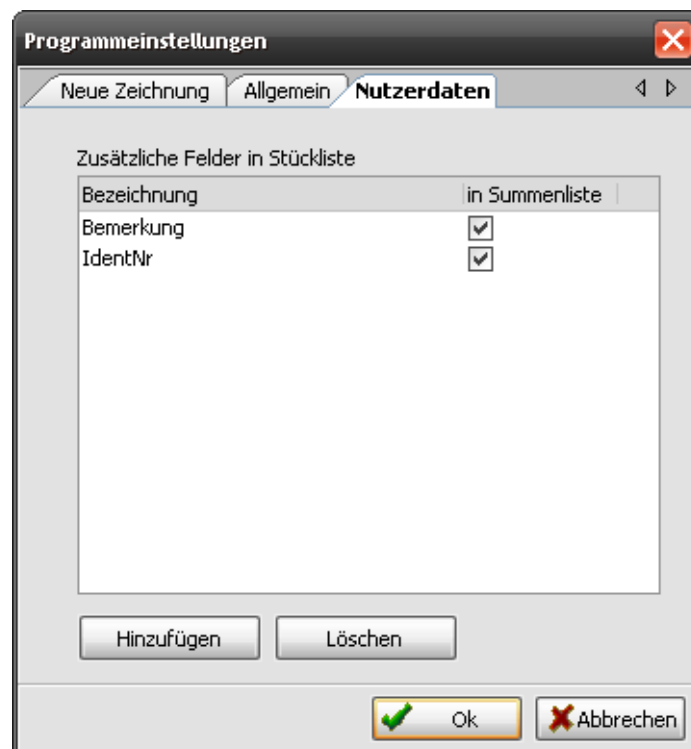
Figure 5



Figure 6



Figure 7



Further settings

Menu option 'Extras' 'Set page' allows the settings for a current project to be changed. This window closely resembles the programme settings under menu option 'File'. The difference is in the fact that the changes are implemented immediately after the closing of the window.

This window is also called up by double clicking on the current project. Therefore it is possible to change the distance of the grid or of the locking in during the drawing process .

Menu option 'Extras' also offers the possibility of changing the language without restarting the programme.

Figure 8

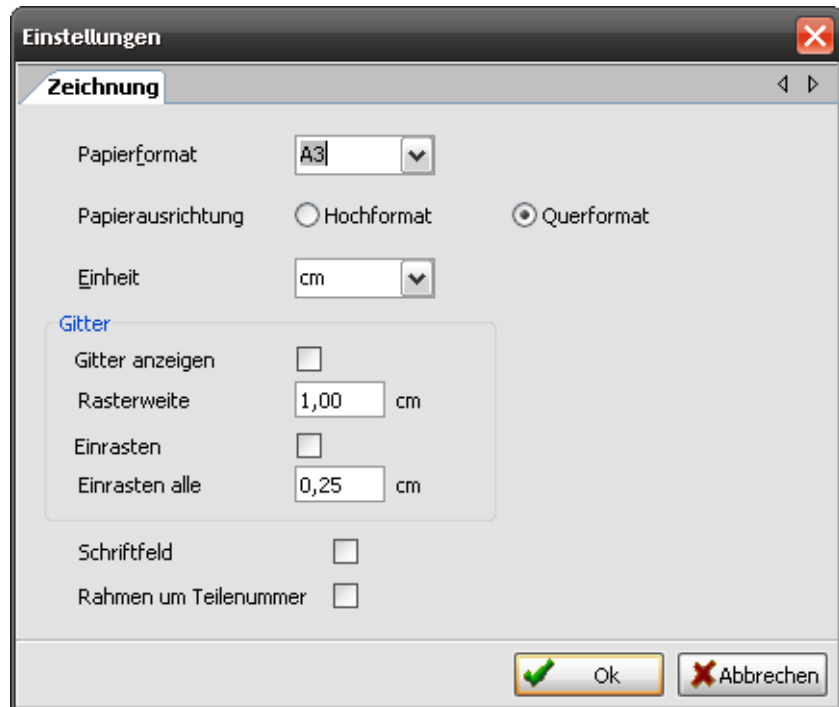
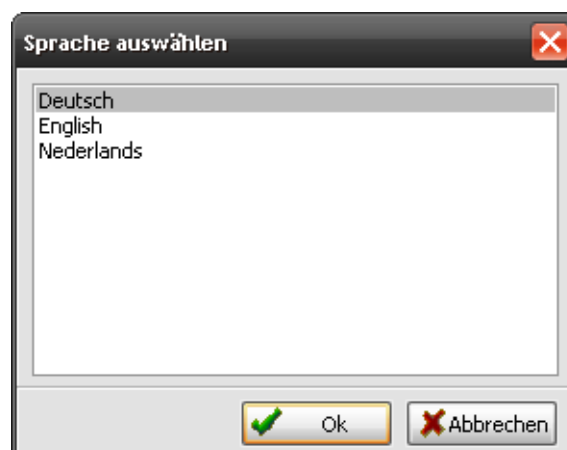


Figure 9



Printings of a circuit diagramme

Menu option 'File' 'Set printer' can be used for setting the print characteristics of a circuit diagramme.

The printer and the paper size can be selected. Formats up to DIN A0 are possible. Portrait and landscape format can be selected. The source stipulates the appropriate indentation for the paper which will be used for the print out.

Menu option 'File' 'Print' starts the printing. Before printing, necessary specifications should be entered under menu option 'File' 'Set printer'.

The set up concerning the size of the circuit diagramme on the print out is important. A larger circuit diagramme can also be printed on a smaller sheet size.

Figure 10

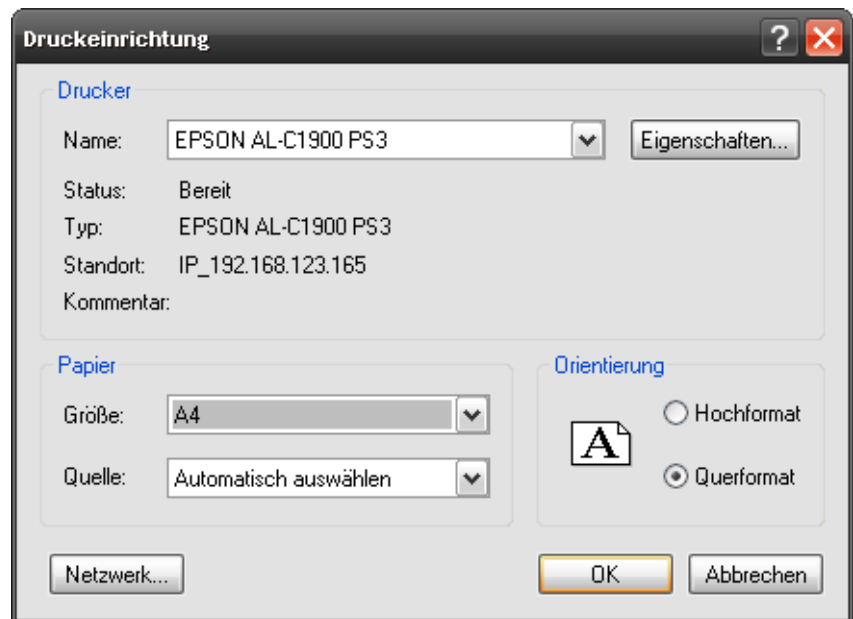
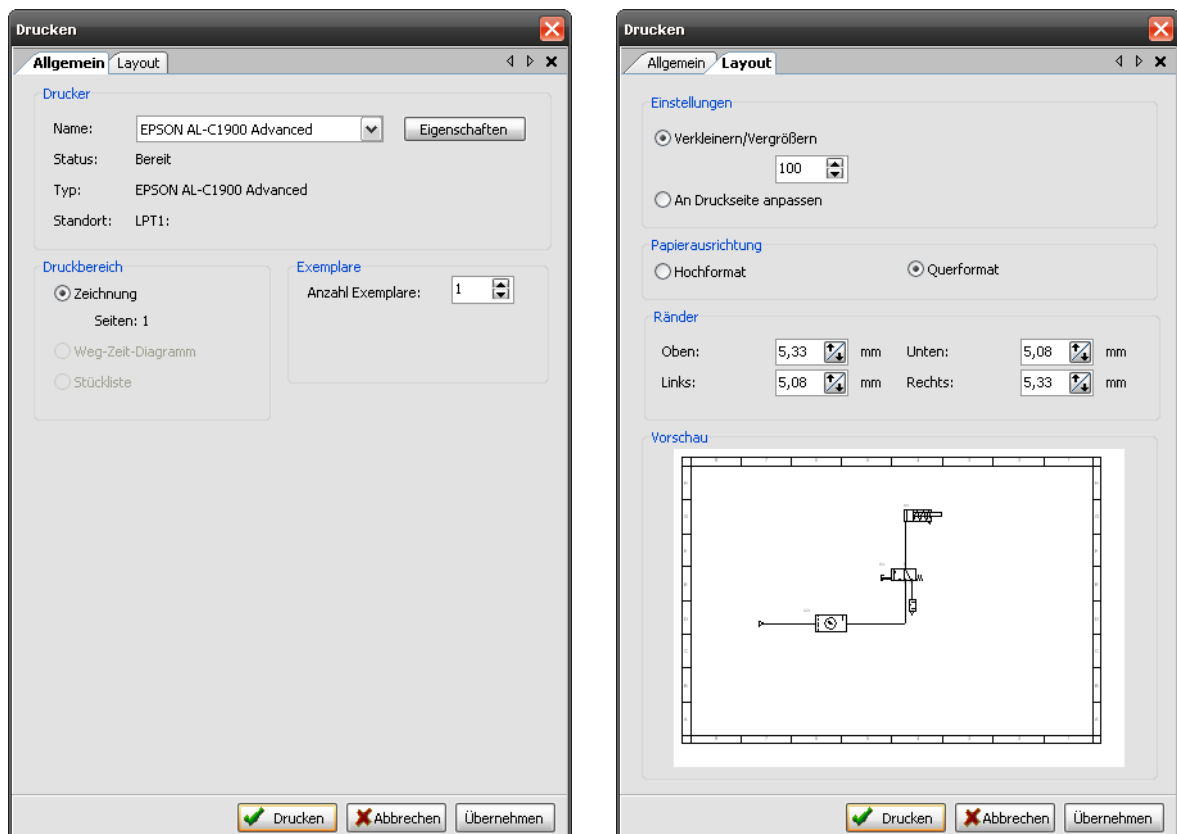


Figure 11



Save a project

Menu option 'File' 'Save' saves a project. If a new name needs to be applied, 'Save as' must be selected.

The pre-setting for the path where files are stored is 'Own files / Ome-gon / Oft2 / files '. However, it is also possible to store a project in another location.

Notepad

Menu option 'Extras' offers a note-pad. Here it is possible to file additional information.

The symbols in the left lower of the notepad window offer the function of moving to different pages of the notepad. New pages can be created by clicking on the + Symbol. The -Symbol deletes the entries.

New pages can be called up by using the appropriate arrow keys. A search box at the top of the window allows texts to be searched for in a title or in the content of single pages.

Figure 12

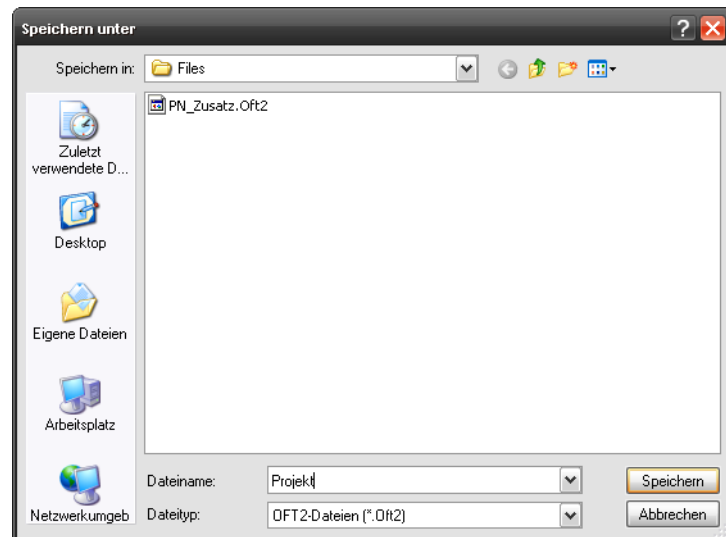
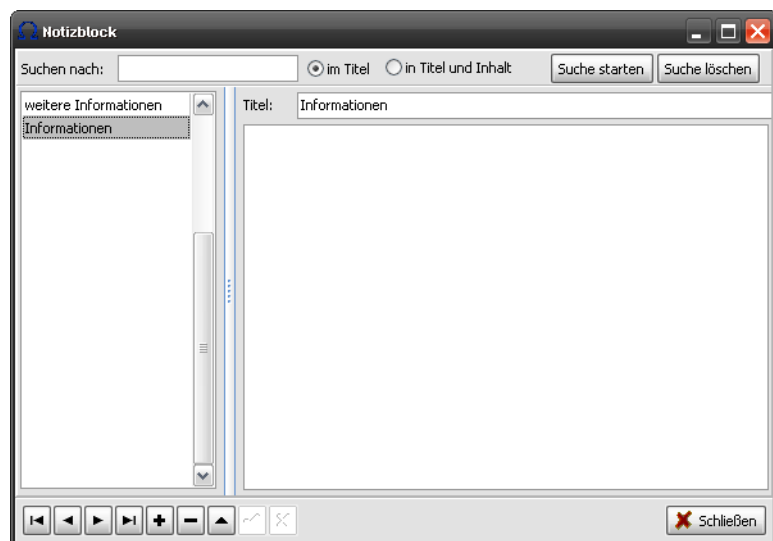


Figure 13



Exercise 1

Creating a pneumatic circuit diagramme

Draw a double acting cylinder which can be extended by operating a push-button and which can be immediately retracted by operating a sensing roller once the end position has been reached. The cylinder should be driven by a pulse valve.

Draw the circuit diagramme so that the feeler (as a signal element) is located at the lower part of the circuit diagramme next to the start push button.

Design a new project

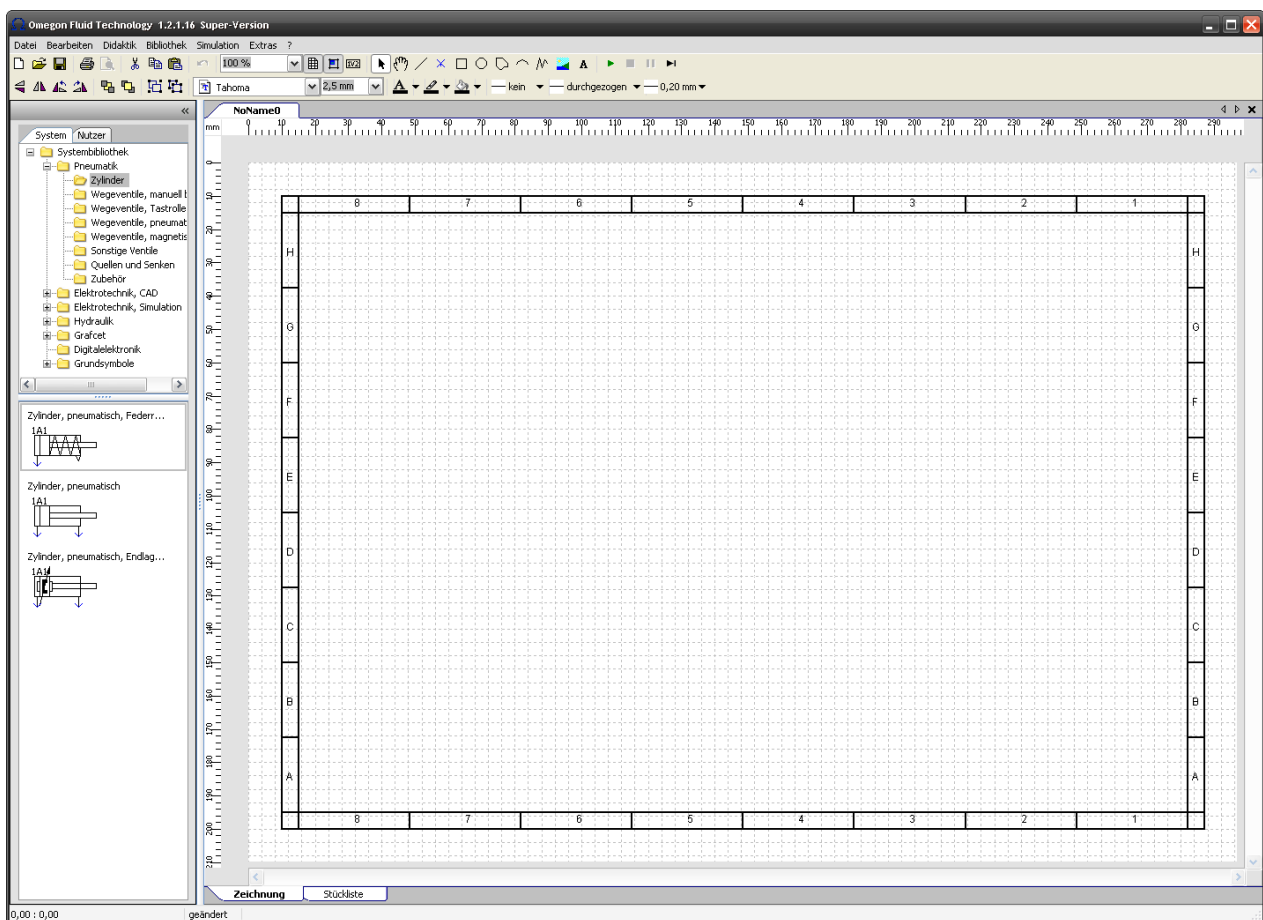
In order to design a new project, call up menu option 'File' 'New project' or click on the corresponding icon directly.

A new window will open. In order to have enough space for the new circuit diagramme, the window should be the maximum available size.

When starting the programme a new project is automatically generated. The above mentioned steps will then be carried out by the programme itself.

Please now choose the category 'Pneumatics' in the systems library. Most symbols can be found in the sub-directories.

Figure 1



Cylinder

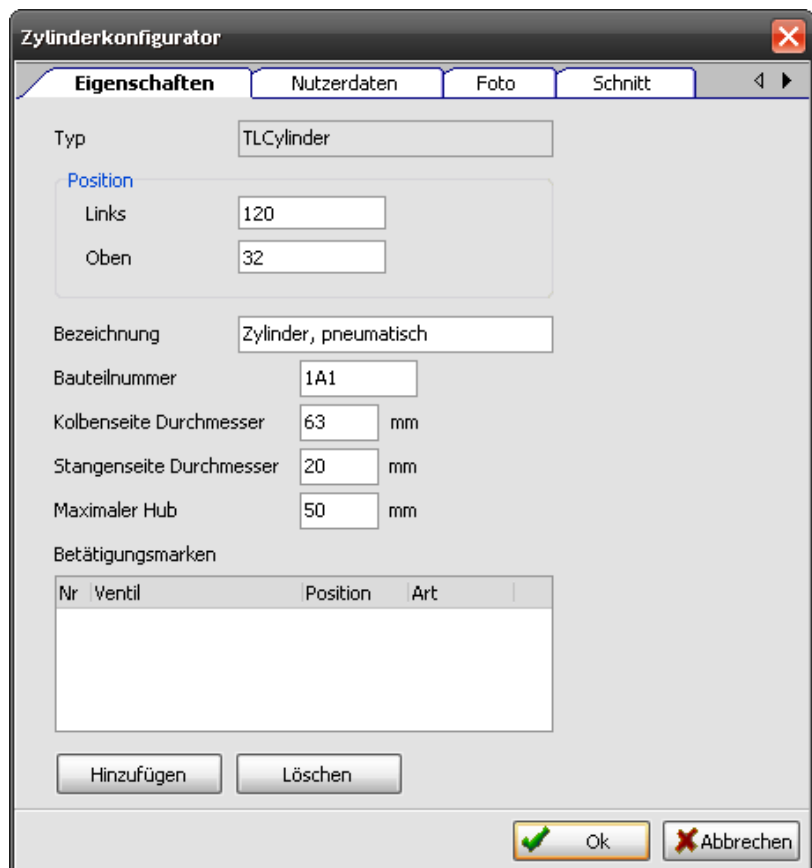
Libraries

First a cylinder should be drawn. The symbol 'pneumatic cylinder' can be selected in the sub-directory 'Cylinder' of the systems library. All symbols can be dragged on the drawing sheet by keeping the mouse button pressed. The symbols can also be shifted afterwards at any time without a problem.

Select a double acting cylinder without a shock absorber at stroke end. A double click on the symbol will open a window offering the possibility of entering further information. The designation of the cylinder can be changed via the part number.

Photos and sectional drawings of the cylinder can be viewed.

Figure 2



Zylinderkonfigurator

Eigenschaften | Nutzerdaten | Foto | Schnitt

Typ: TLCylinder

Position

Links: 120

Oben: 32

Bezeichnung: Zylinder, pneumatisch

Bauteilnummer: 1A1

Kolbenseite Durchmesser: 63 mm

Stangenseite Durchmesser: 20 mm

Maximaler Hub: 50 mm

Betätigungsmarken

| Nr. | Ventil | Position | Art |
|-----|--------|----------|-----|
|-----|--------|----------|-----|

Hinzufügen | Löschen

Ok | Abbrechen

Data for the parts list

The settings for the parts list can be found under tab 'User data'.

Further information about the symbol can be entered here. If other additional fields are required, they can be issued under menu option 'File' 'Programme settings'. The new fields related to the cylinder are available immediately

Figure 3

The screenshot shows a software window titled 'Zylinderkonfigurator'. It has four tabs: 'Eigenschaften', 'Nutzerdaten' (which is selected), 'Foto', and 'Schnitt'. The 'Nutzerdaten' tab contains a table with two columns: 'Schlüssel' and 'Wert'. The table has three rows: 'Bemerkung', 'IdentNr', and an empty row. At the bottom of the window, there are two buttons: 'Ok' (with a green checkmark icon) and 'Abbrechen' (with a red X icon).

| Schlüssel | Wert |
|-----------|------|
| Bemerkung | |
| IdentNr | |
| | |

Directional control valve

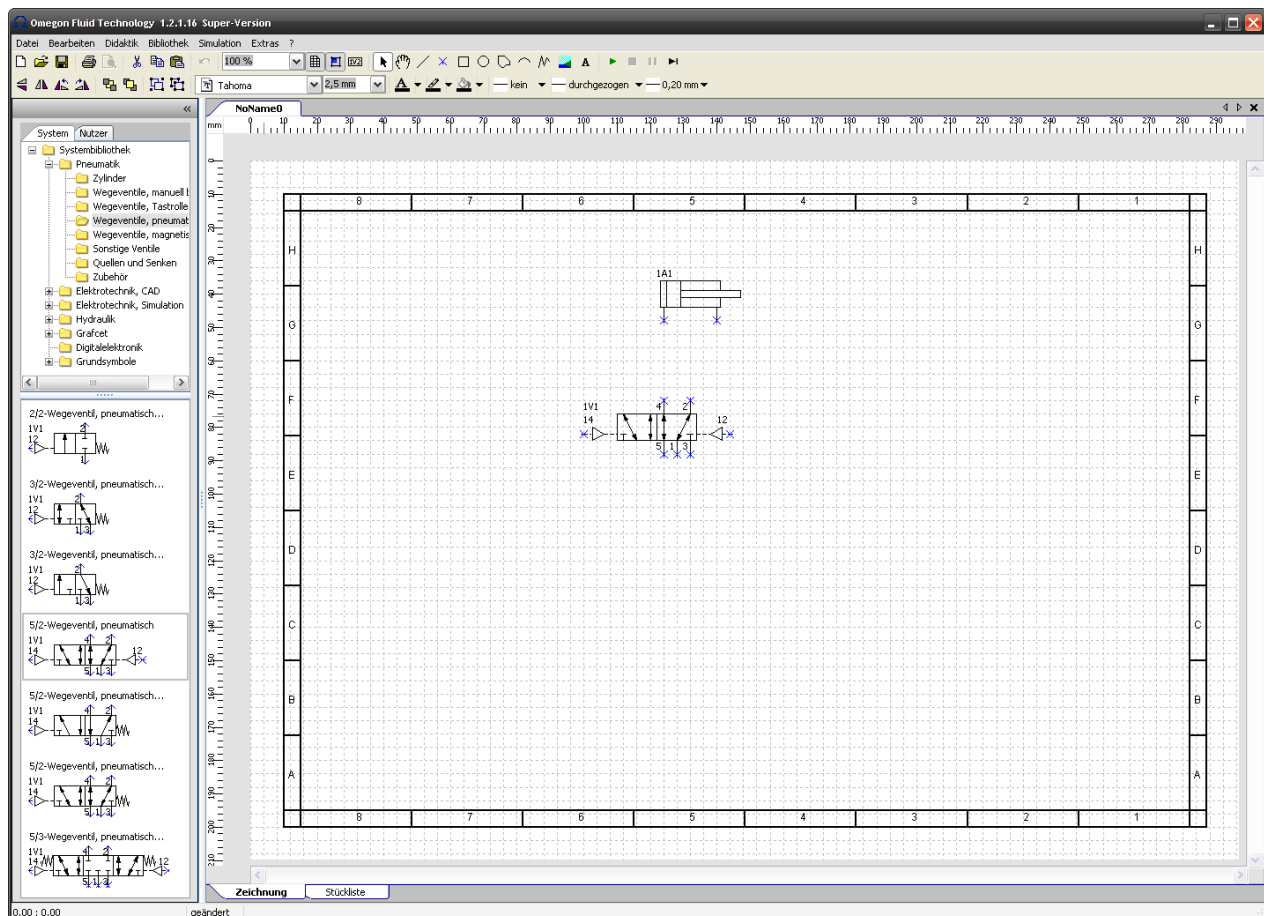
The directional control valve is placed under the cylinder. In this example the actuator used for piloting the cylinder should be an impulse valve.

An appropriate symbol can be found in the subdirectory 'Pneumatic direc-

tional control-valves'. The symbol is dragged with pressed mouse button onto the drawing sheet.

A double click on the symbol opens a window for the configuration.

Figure 4



Settings for directional control valves

It is possible to configure the valve in the window for the settings. The symbol designation can be changed, if this is required.

Under 'User data' the information for the parts list can be entered. The tabs „photo“ and „cut drawing“ will open to show an example of a valve.

In the other subdirectories of the library various other directional control valves can be selected, e.g. operated manually, by rollers or with solenoids.

Figure 5

The screenshot shows the 'Ventilkonfigurator' window with the 'Eigenschaften' tab selected. The window contains the following fields and controls:

- Typ:** TLValve
- Position:**
 - Links: 100
 - Oben: 72
- Bezeichnung:** 5/2-Wegeventil, pneumatisch
- Bauteilnummer:** 1V1
- Betätigung links:**
 - Federkraft: 0
 - Schaltdruck: 2
 - Anschlusskennung: (empty)
 - Auslösender Zylinder: (dropdown menu)
 - Position: 0 %
- Betätigung rechts:**
 - Federkraft: 0
 - Schaltdruck: 2
 - Anschlusskennung: (empty)
 - Auslösender Zylinder: (dropdown menu)
 - Position: 0 %
- Buttons:** Ok (with green checkmark icon) and Abbrechen (with red X icon)

Further directional control valves

First create two 3/2 directional control valves. Both valves should have a spring return. One valve will be operated by a push-button and the second valve by a roller.

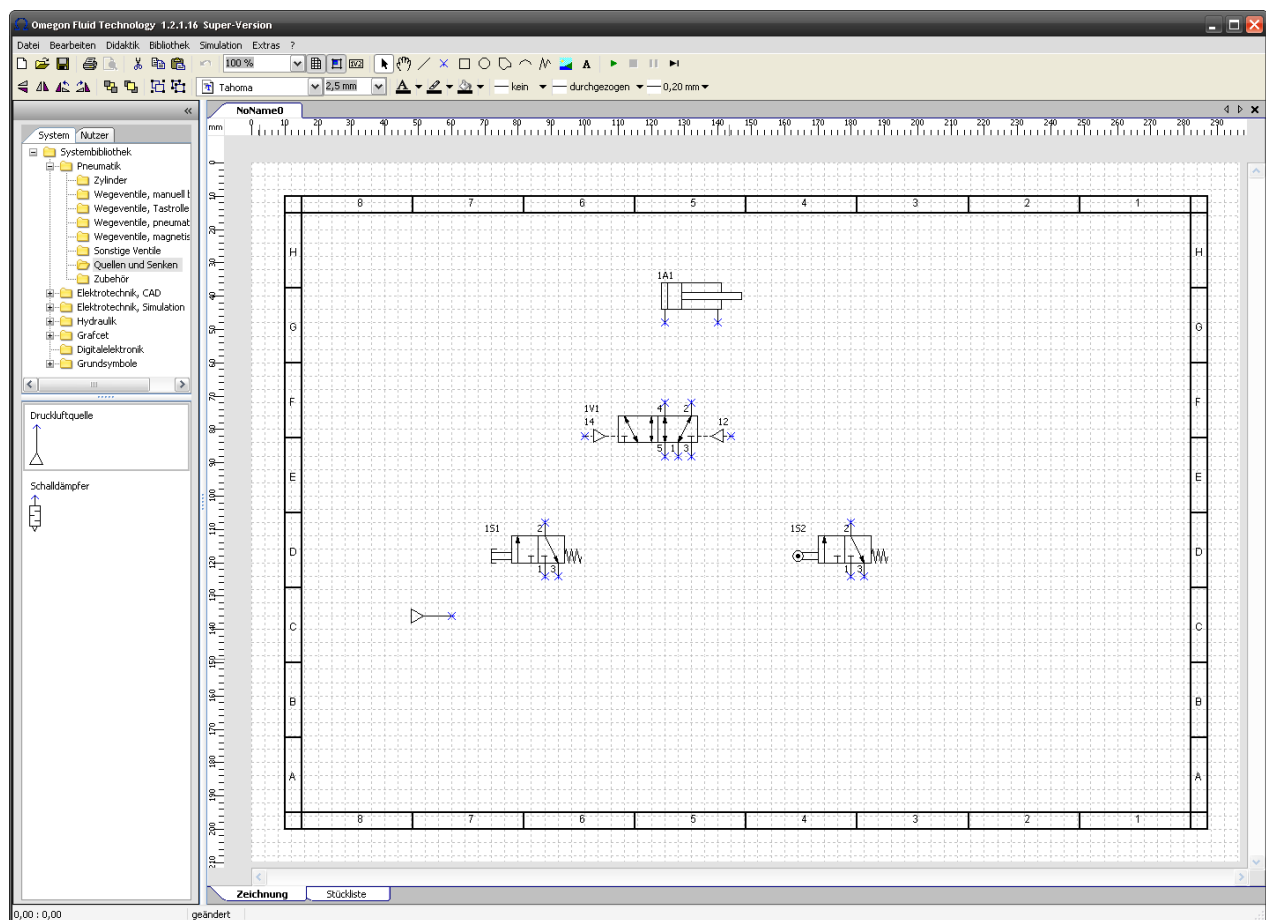
Select a 3/2 directional control valve with a push-button from the library and place it on the drawing sheet in the same way that the 5/2 directional control valve was placed before-hand. You will find the valve with the roller in the subdirectory of the library. Both valves can now be moved to the correct position. Positioning a selected symbol is also possible with the cursor keys.

Afterwards you should open the setting-window by double clicking to change the names of the valves.

It is important that in the case of several similar valves different names are allocated, otherwise the valve with the roller cannot receive the impulse from the corresponding cylinder. The valve with the push-button should have the designation „1S1“, the valve with the roller the designation „1S2“.

Position the compressed air source. The compressed air source symbol can be turned by steps of 90° by clicking on the rotation symbol in the icon bar.

Figure 6



Create a circuit diagramme

Position all symbols as shown in the figure below. T-joints for branching out various lines can be found in the sub-directory 'Accessories'.

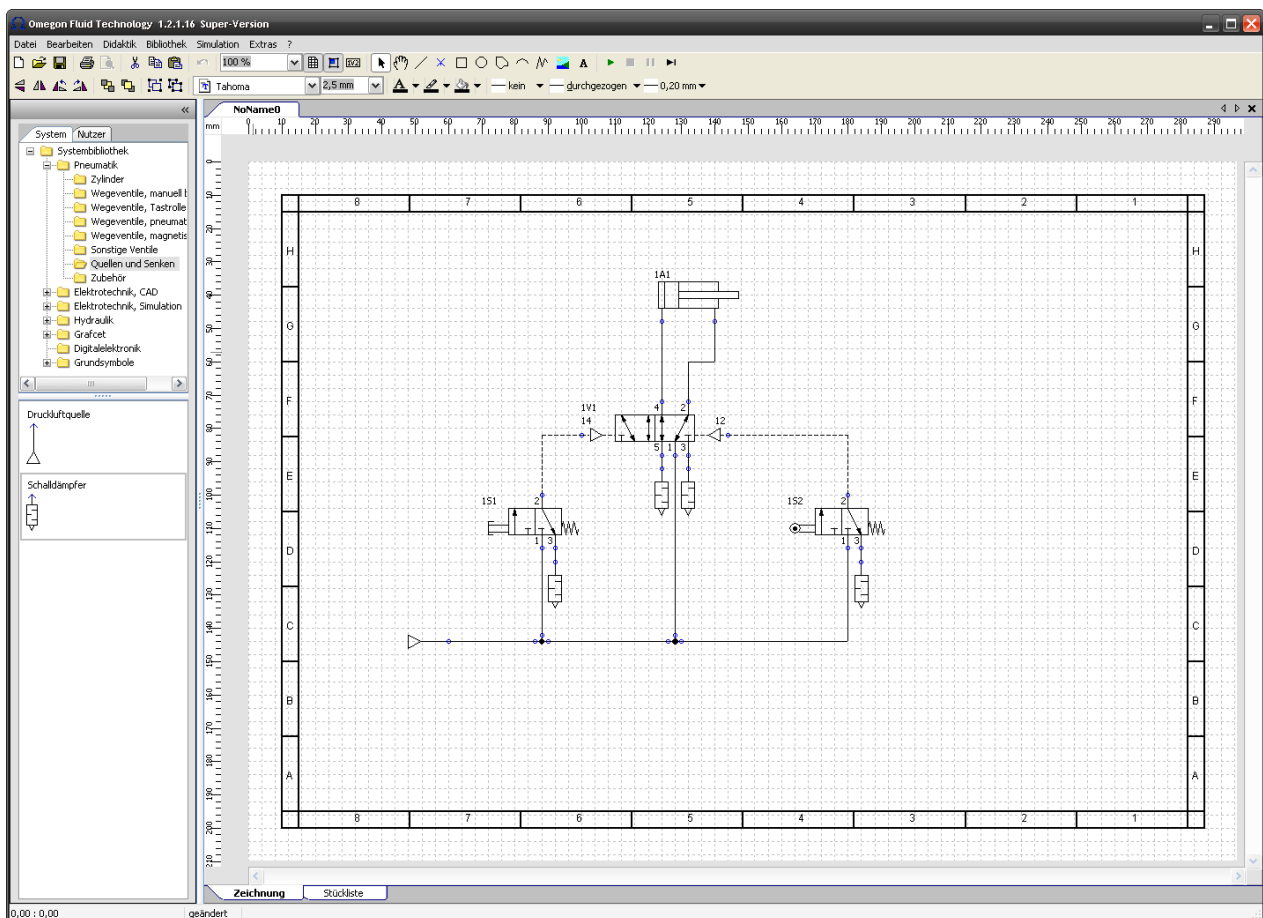
Connect the symbols with the lines by clicking on the connection from which you would like to draw the

line. The mouse pointer converts itself into a hand when it is in the right position.

Move the mouse now by keeping it pressed until the end of the line or the connecting position. In this way

several lines can be drawn. Further moving of the lines will be possible by clicking on the points marked green.

Figure 7



Control lines can be created by changing the line type in the icon bar from 'continuous' to 'dashed'. The control lines remain active as long as no change is made.

Connect all symbols as shown in the figure below.

Sensors and operation

Now the operation mode of the roller must still be set. A double click on the cylinder symbol will open the window for entering further details.

Press the button 'Add'. A new entry in the table will be made. Select in column 'valve' the directional control valve „1S2“.

The position of the valve can be arranged in the next column. Since the valve should be in the extended end position, 100% should be entered.

The right column defines whether it is a roller with or without a no-load return flow. 'Both' must be selected in the case of a general roller. The two other possibilities only exist if it is a roller with a no-load return flow. In this case it must be stipulated whether the roller is operated only while extending or while retracting.

Close the window. The circuit diagramme has been completed.

Figure 8

Zylinderkonfigurator

Eigenschaften | Nutzerdaten | Foto | Schnitt

Typ: TlCylinder

Position

Links: 120

Oben: 32

Bezeichnung: Zylinder, pneumatisch

Bauteilnummer: 1A1

Kolbenseite Durchmesser: 63 mm

Stangenseite Durchmesser: 20 mm

Maximaler Hub: 50 mm

Betätigungsarten

| Nr | Ventil | Position | Art |
|----|--------|----------|-------|
| 1 | 1S2 | 100 | beide |

Hinzufügen | Löschen

Ok | Abbrechen

Parts lists

The symbols used in a circuit diagramme can be indicated in a parts list. It can be called up by clicking on the tab index below the drawing. The parts list can be stored for further processing as text file or for a table calculation.

Every symbol can be represented in the parts list separately or can be summarized into a sums list. In this case the separate symbol designations are not indicated.

Figure 10

| Position | Menge | Einheit | Bauteilnummer | Bezeichnung | Bemerkung | Identifizierung |
|----------|---------|---------|---------------|-----------------------------------|-----------|-----------------|
| 1 | 1 Stück | IA1 | | Zylinder, pneumatisch | | |
| 2 | 1 Stück | IV1 | | 5/2-Wegeventil, pneumatisch | | |
| 3 | 1 Stück | IS1 | | 3/2-Wegeventil, Taster | | |
| 4 | 1 Stück | IS2 | | 3/2-Wegeventil, Taststößel, Feder | | |
| 5 | 1 Stück | | | Druckluftquelle | | |
| 6 | 1 Stück | | | Schalldämpfer | | |
| 7 | 1 Stück | | | Schalldämpfer | | |
| 8 | 1 Stück | | | Schalldämpfer | | |
| 9 | 1 Stück | | | Schalldämpfer | | |

Figure 11

| Position | Menge | Einheit | Bezeichnung | Bemerkung | Identifizierung |
|----------|---------|---------|-----------------------------------|-----------|-----------------|
| 1 | 1 Stück | | Zylinder, pneumatisch | | |
| 2 | 1 Stück | | 5/2-Wegeventil, pneumatisch | | |
| 3 | 1 Stück | | 3/2-Wegeventil, Taster | | |
| 4 | 1 Stück | | 3/2-Wegeventil, Taststößel, Feder | | |
| 5 | 1 Stück | | Druckluftquelle | | |
| 6 | 4 Stück | | Schalldämpfer | | |

Create your own symbols

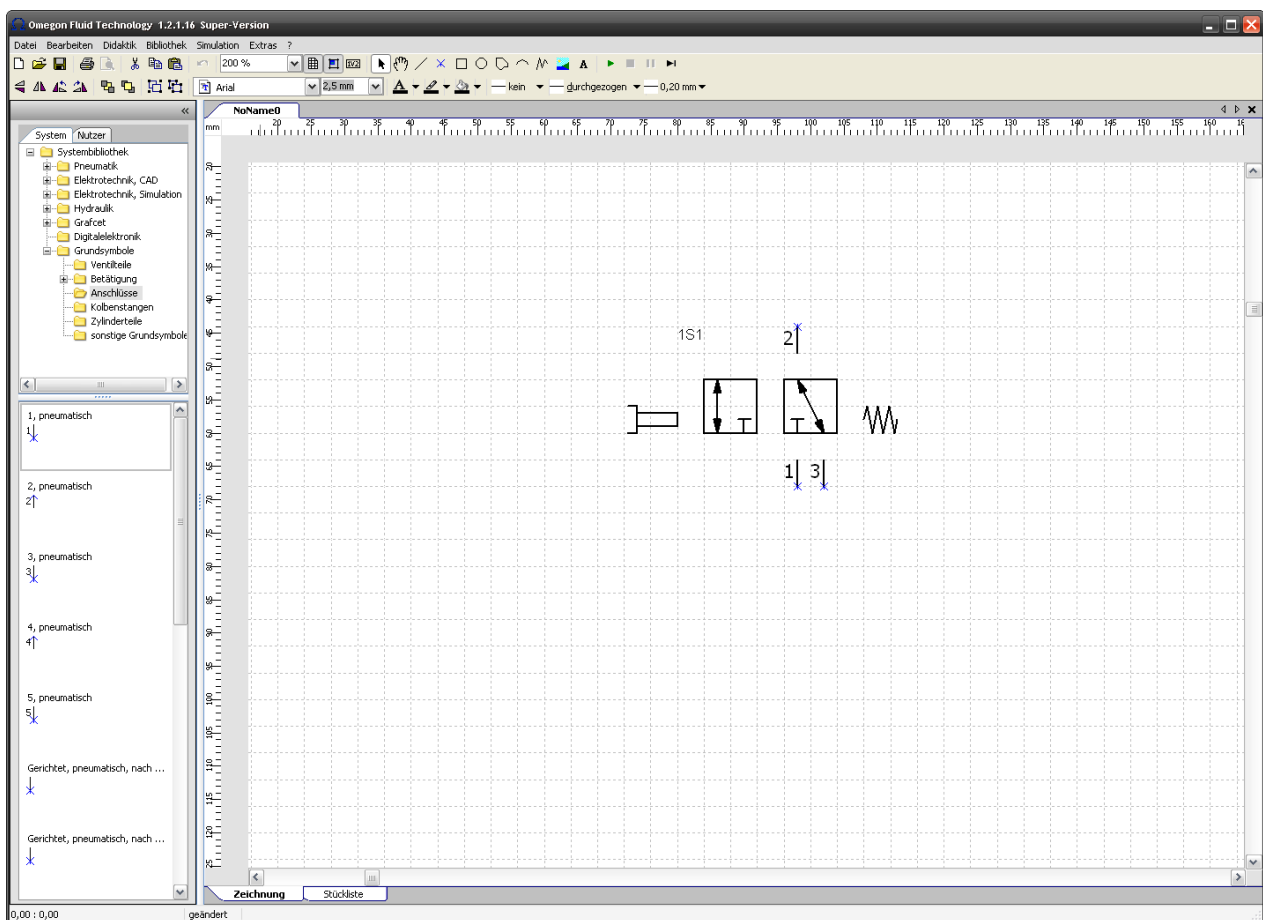
In addition to the existing symbols, new symbols can also be created by assembling some basic symbols offered in a special library. A simulation is also possible with these newly created symbols.

Numerous separate parts are offered in the library of basic symbols.

For example, a directional control valve should be created. In this case the required parts of a valve, such as a basic body, an operation mode, compressed air connections and a text field for the designation is needed.

However, the creation of the new symbol is only possible if the appropriate licence was acquired.

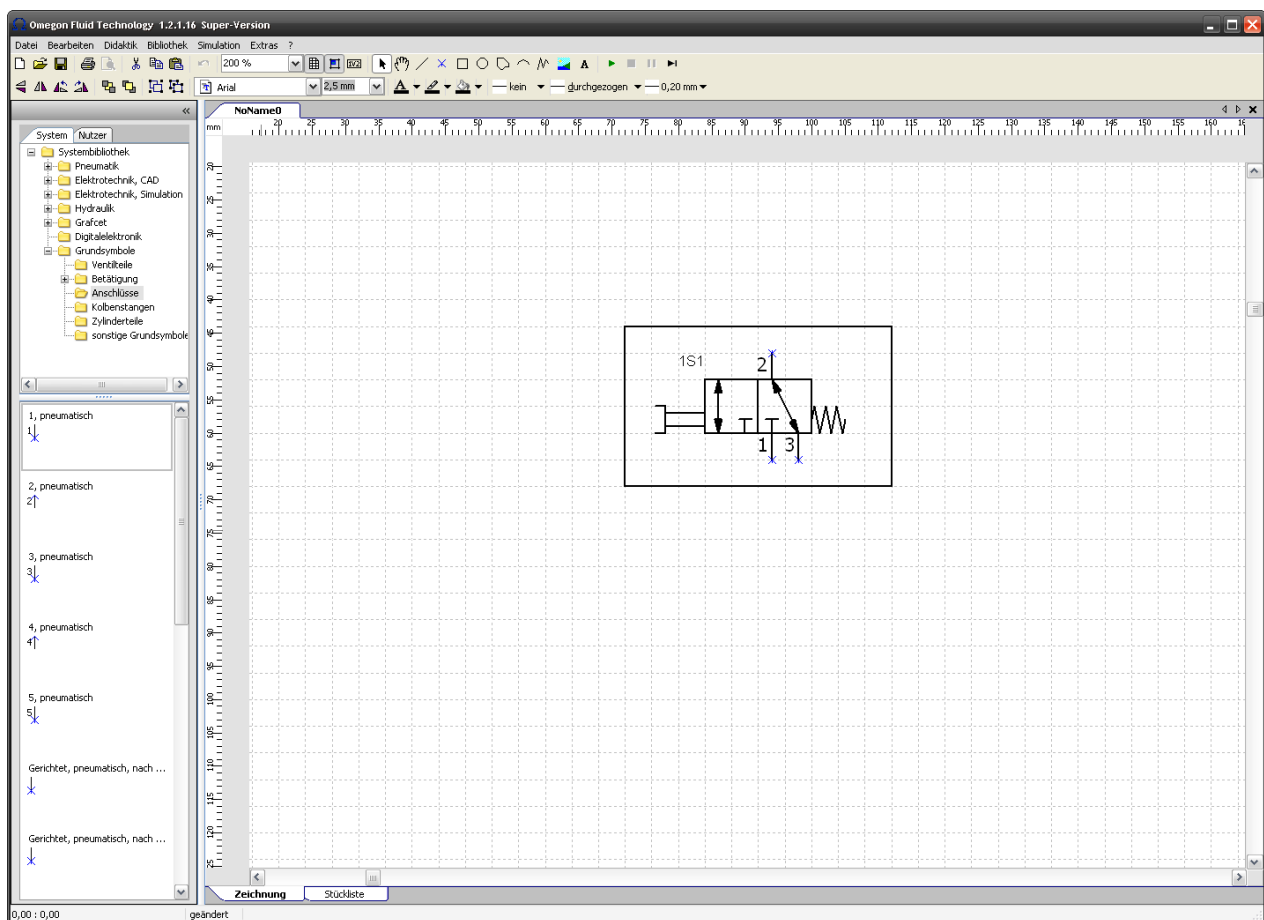
Figure 12



All single parts should be place on the drawing sheet by dragging and dropping. The text field can be added by clicking the text symbol in the icon bar. A subsequent click on the drawing sheet opens a window for entering the text.

After all the parts have been joined together, the new symbol should be framed with a rectangle. It is important that all parts are included in the frame.

Figure 13



The framework should not be visible. Therefore, no colour should be assigned.

After selecting the rectangle, the frame is to be changed with the symbols for the assignment of the colour into 'no color'. The line colour, and not the filling colour, has to be changed.

Afterwards the rectangle is to be deactivated by clicking somewhere in the drawing sheet. Now the rectangle should not be visible any more.

After changing the line colour the general line colour should be changed again. Otherwise all newly created drawings would be invisible.

In order to create one symbol, all parts including the framework should be activated. Under menu option 'Library' 'change selection' and 'Change selection into a valve' the new symbol will be generated.

If the required parts were not correctly selected an error will show. A window will open in which the connections of the separate connections

can be corrected. The pre-setting can usually be applied.

A new symbol is now available after all orders have been executed faultlessly. The function can be tested by starting the simulation.

Figure 14

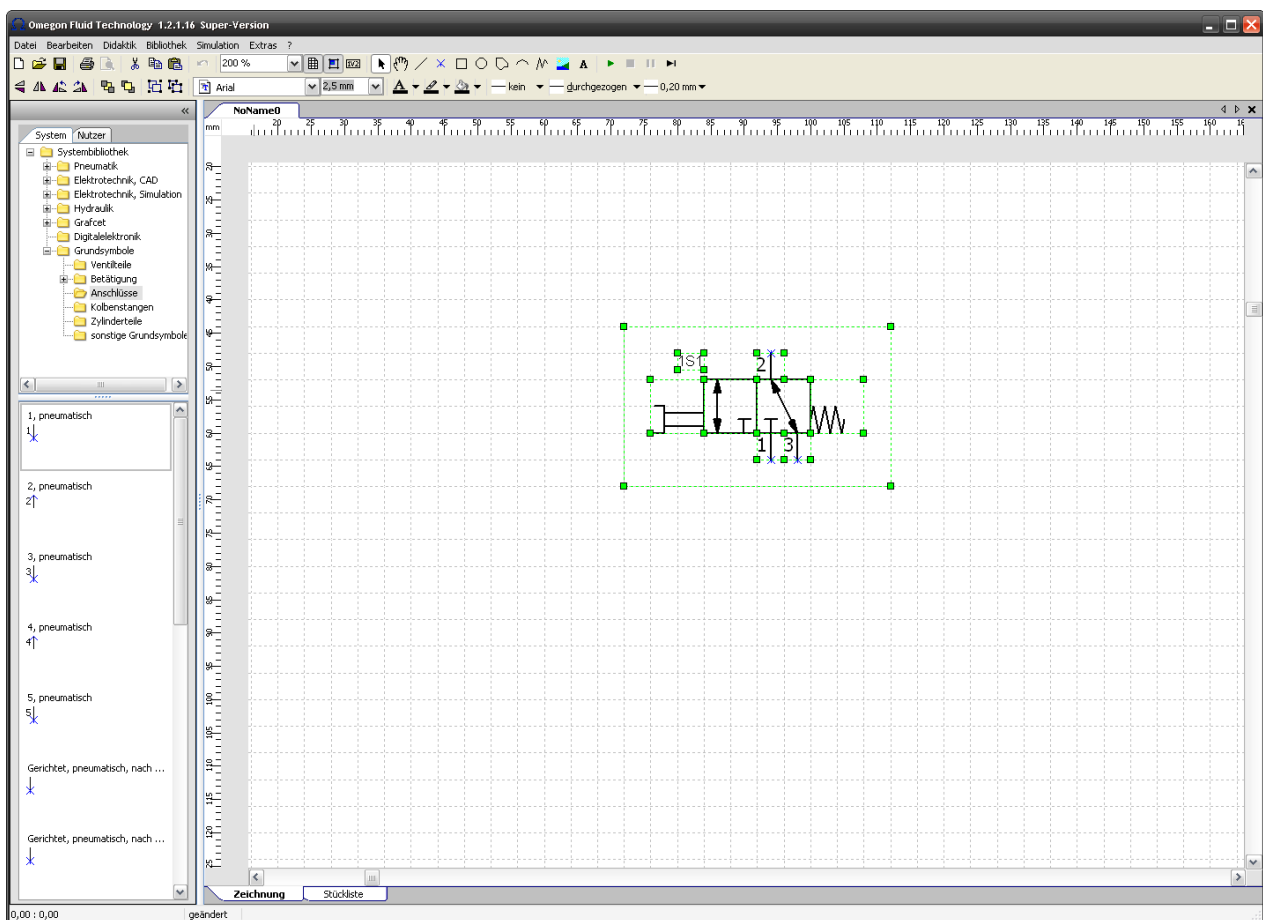


Figure 15

Auswahl in Ventil wandeln

Bezeichnung: 3/2-Wegeventil

Bauteilnummer: 151

Anschlüsse zuordnen

| Anschluss | interner Anschluss |
|----------------|--------------------|
| 1, pneumatisch | 1 |
| 2, pneumatisch | 2 |
| 3, pneumatisch | 3 |

Typ

☒ pneumatisch

☐ hydraulisch

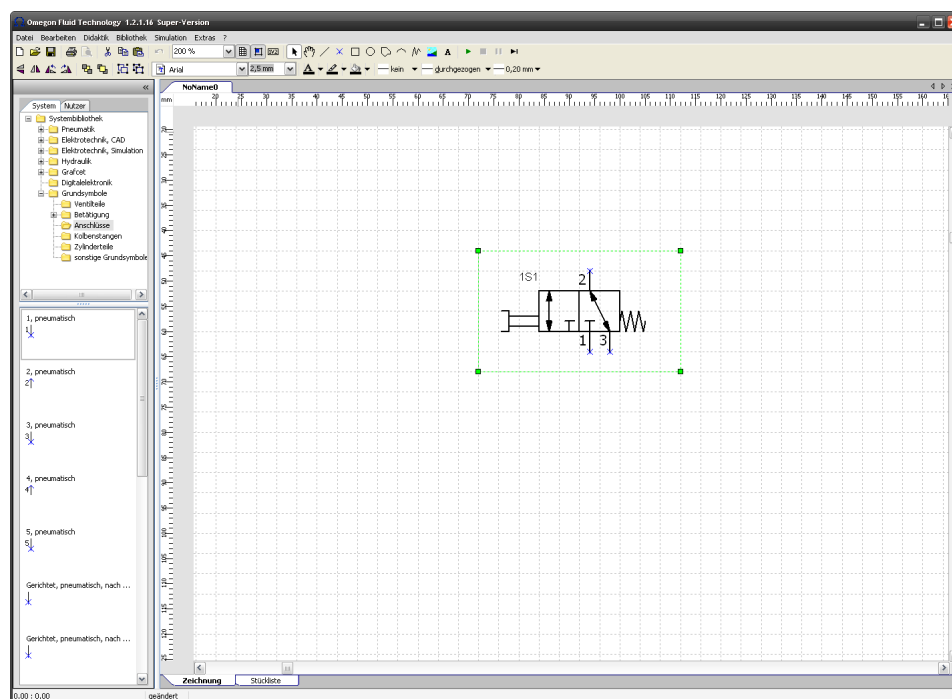
Ausrichtung

☒ links-rechts

☐ oben-unten

Ok Abbrechen

Figure 16



Exercise 2

Creating an electropneumatic circuit diagramme

Draw a double acting cylinder which should be extended by operating a push-button and which should be retracted after reaching the end position by the operation of a sensing roller. The cylinder should be driven by a valve with a spring return.

The piloting of the directional control valves of the cylinders should take place via a simple relay control. A latched input signal should be provided.

Draw the complete circuit diagramme on one work sheet.

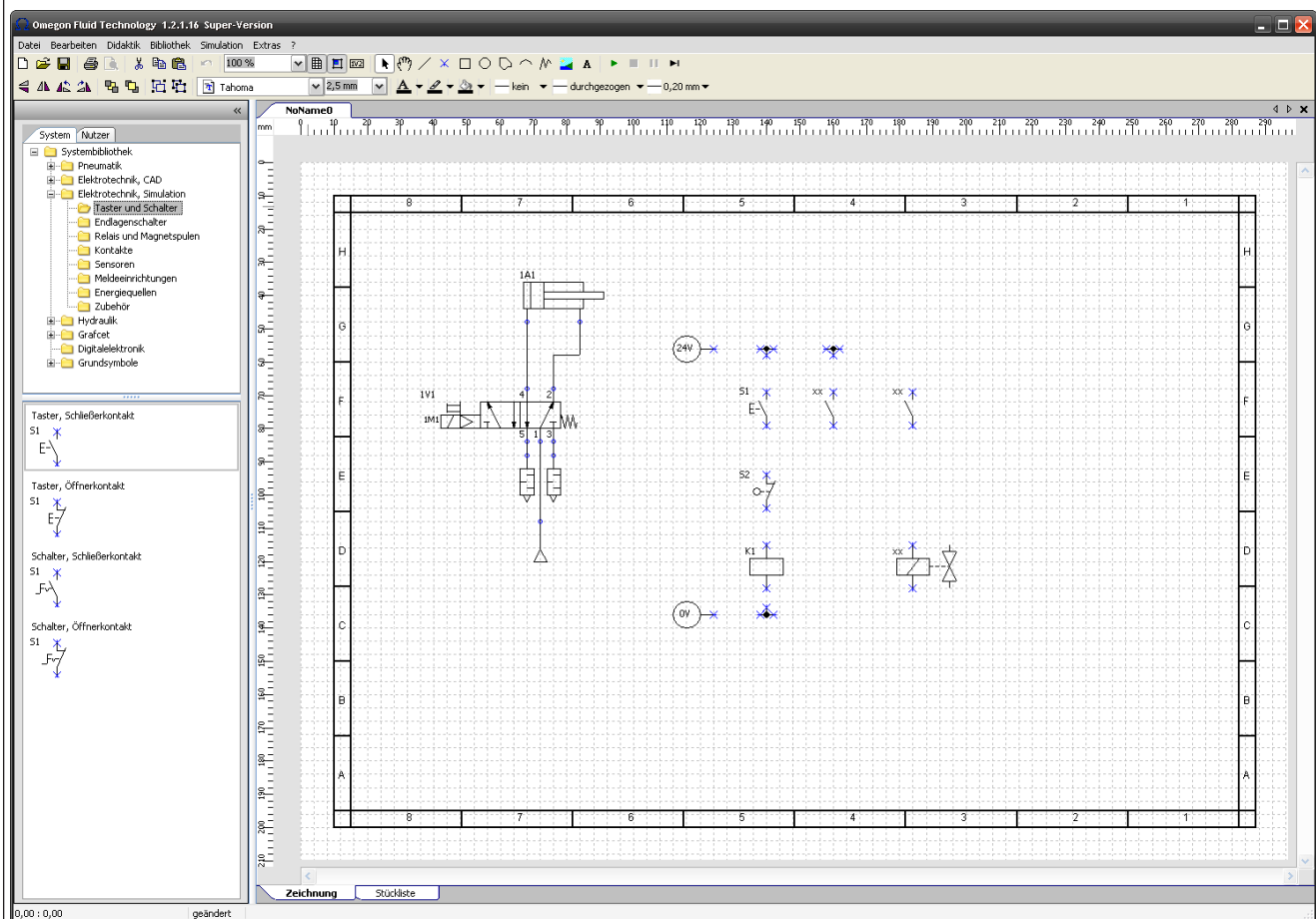
Electropneumatic circuit diagramme

Firstly create the pneumatic circuit diagramme

Draw a double acting cylinder, a 5/2 directional control valve with a return spring, electric activation and manual aided operation as well as a compressed air source. Connect the symbols via the circuit points to the lines.

Check the designation of the solenoid in the properties window of the directional control valve. The designation should be „1M1“.

Figure 1



Create the electric circuit diagramme

Go to the electric symbols within the library. Place the symbols, as shown on the picture, on the work sheet.

Use the symbols for 24 V and 0 V to produce a voltage source. For the latched input signal a feeler with a normally opened contact (NO) switch is needed and a sensing roller with a normally closed contact (NC) switch. Place the switches one below the other.

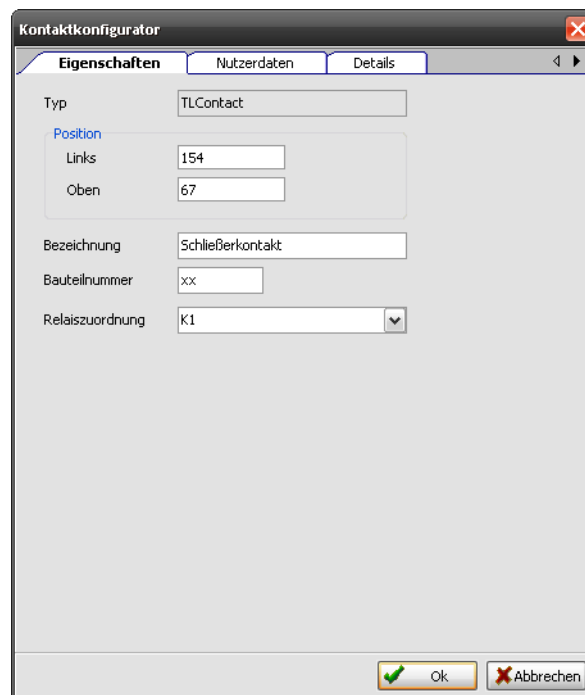
Additionally the symbol for a relay and both contacts are needed. Place the symbols, as shown on the picture.

A double click on the relay opens the properties window. The designation of the relay can be changed here. „K1“ is preset.

A double click on the symbols of the contacts also opens a property window. The relay can be selected here from a list. However, in this example only one relay is listed. Close the property window.

Place the symbol for the solenoid on the circuit diagramme.

Figure 2



In order to connect the symbol of the solenoid in the electric circuit diagramme to the symbol of the pneumatic circuit diagramme, the properties window of the solenoid must be opened.

The required solenoid can be selected in the table. In this example only the designation "1M1" can be found. In the case of impulse valves both solenoids can be selected.

Now the property window can be closed again.

Figure 3

The screenshot shows a software window titled 'Magnetspulenkonfigurator' with a close button (X) in the top right corner. The window has three tabs: 'Eigenschaften' (selected), 'Nutzerdaten', and 'Details'. The 'Eigenschaften' tab contains the following fields:

- Typ:** TLsolenoid
- Position:**
 - Links:** 178
 - Oben:** 115
- Bezeichnung:** Magnetspule
- Bauteilnummer:** 1M1
- Zuordnung Magnetbetätigung:** 1M1 (with a dropdown arrow)

At the bottom right of the window are two buttons: 'Ok' (with a green checkmark icon) and 'Abbrechen' (with a red X icon).

The sensing roller also has to be configured. In the properties window it will be stipulated which cylinder operates the sensing roller and at which point of the cylinder stroke the sensing roller will be located.

Figure 4

Grenztasterkonfigurator

Eigenschaften Nutzerdaten Details

Typ: TLPistonPositionSwitch

Position

Links: 132

Oben: 92

Bezeichnung: Grenztaster, Öffnerkontakt

Bauteilnummer: 52

Auslösender Zylinder: 1A1

Position: 100 %

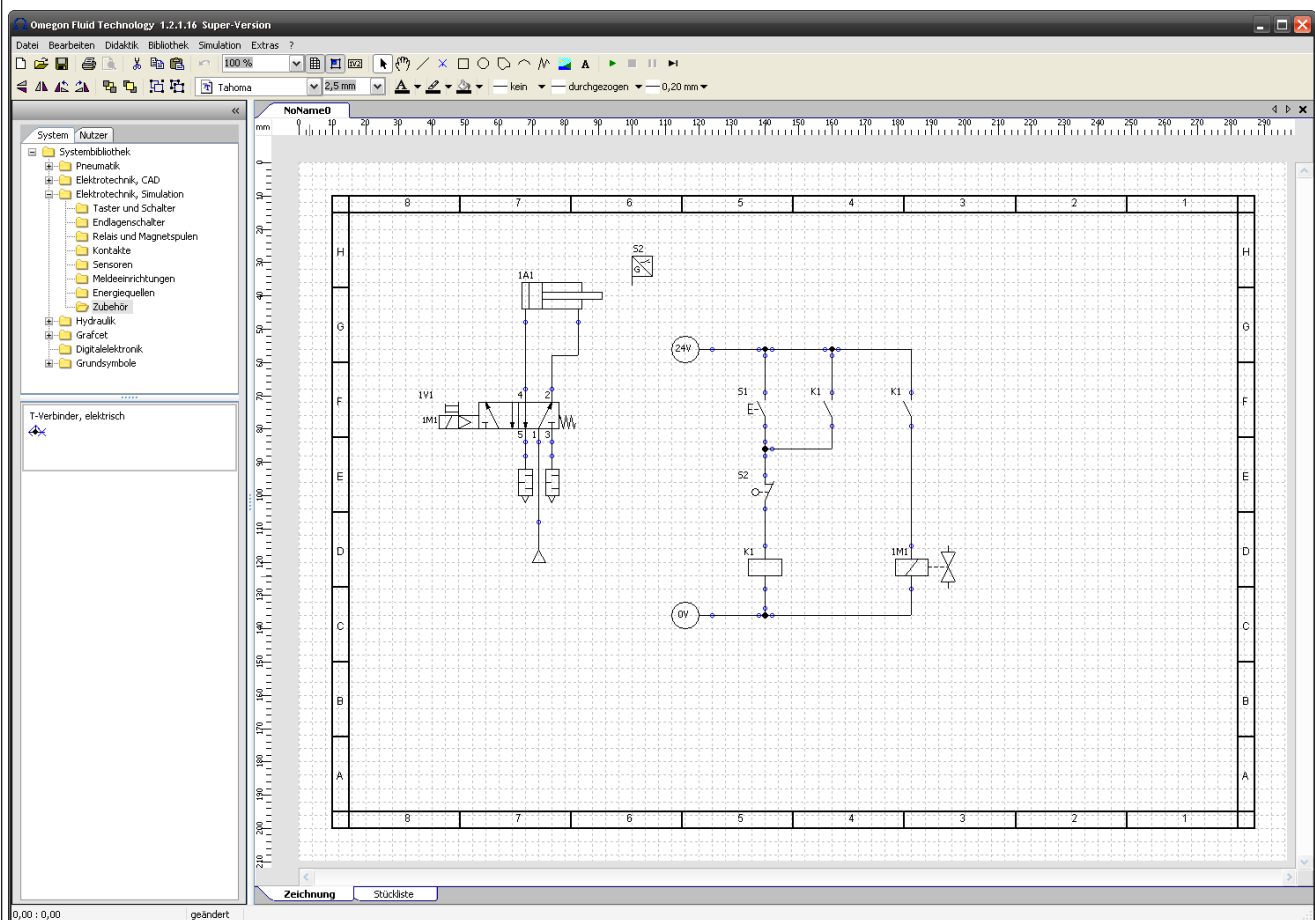
Ok Abbrechen

All symbols in the electric circuit diagramme must be connected to lines. As in the case of the pneumatic circuit diagrammes T-junctions will be used for branching off.

Alignment of the symbols can be done by using the cursor keys.

After completion, the simulation can be started and the function of the circuit diagramme can be checked.

Figure 5



Path-time diagramme

Under menu option 'Simulation' the 'Path-time diagramme' can be selected. A click on the button will open a window. Various adjustments can be made here.

A new symbol can be added to the diagramme by clicking on the button 'Add'. The cylinder should be selected first. As a second symbol, for

example, a directional control valve can be selected.

Different colours should be assigned to both symbols. Afterwards the window can be closed.

Figure 6



After starting the simulation the condition of the cylinder and the directional control valve are indicated in the Path-time Diagramme. By activating the starter push-button the directional control valve will be shifted and the cylinder will be extended.

The window of the Path-time Diagramme is always placed above the circuit diagramme. It can be moved, so that other sections of the circuit diagramme become visible.

If 'automatic feed' is selected, the plotting of the diagramme will move to the left side and eventually leave the visible section of the window. By pressing the mouse button this part can be pulled back, to become visible again. In this case the selection 'Automatic feed' will be cancelled.

Figure 7

